The Complex Liver Transplant Procedure

Charles M. Miller
Professor of Surgery
Director of Liver Transplantation
Cleveland Clinic
What makes certain cases very difficult?

- Multiple previous hepato-biliary surgeries
- Multiple previous transplants especially with partial grafts
- Porto-mesenteric thrombosis
- Severe coagulopathy
- Previous Radiation Therapy
- Combinations of above
Technical Principles for Complicated Liver Transplants

- Good pre-operative planning using tri-phasic CT’s or MRI’s
- Approach it like an aortic aneurysm; control the inflow and outflow early
  - To get hilar control find the caudate; will lead you behind the hilum and anterior to the cava. This facilitates vascular control
  - Cava above and below.
  - It is easier to get good cuffs once the liver is out.
- Assure yourself good portal inflow and venous outflow; everything else will follow
- Systemic bypass can be helpful.
Caudate lobe: hepatic venous drainage

Middle hepatic vein  Aranzio’s ligament

4

2 - 3

Lesser omentum

Left portal branch

SPIEGEL LOBE

PARACAVAAL PORTION

IVC

Bartlett, 1996
Technical Tips and Tricks

- Plan extensively and create a set of options depending on what you find
- General “Nickenpush” – differential tensile strength of tissue
- Get in the right plane and try to stay close to the liver.
- Do what’s easy and everything else becomes easy
- Use of sealing devices to help intermittent hemostasis
- Stay calm!
Three Cases

1. Extensive PVT with spleno-renal shunt

1. Re-transplant of left lateral segment graft with PVT and extra-luminal TIPS

2. Primary Transplant 30 years s/p right nephrectomy, right hepatectomy and RUQ radiotherapy resulting in secondary sclerosing cholangitis, duodenal stricture and PVT
Portal Vein Thrombosis and Liver Transplant Survival Benefit

Michael J. Englesbe, Douglas E. Schaubel, Shijie Cai, Mary K. Guidinger, and Robert M. Merion

Departments of Surgery, and Biostatistics, University of Michigan, Ann Arbor, MI; Scientific Registry of Transplant Recipients, Ann Arbor, MI; Kidney Epidemiology and Cost Center, University of Michigan, Ann Arbor, MI; and Arbor Research Collaborative for Health, Ann Arbor, MI
PVT and LT survival benefit

- Shift in the benefit curve.
- “The threshold for transplant benefit among patients without PVT was MELD score >11 compared to MELD score >13 for patients with PVT.”

Patients with MELD >13 benefit from LT
Extensive PVT not amenable to primary PV reconstruction

- Reno-portal anastomosis
- TIPS +/- anticoagulation followed by LT
- The unusual collateral!
Large Spontaneous Splenorenal Shunt with Chronic PV Thrombosis
Video
- Reno-portal Anastomosis -
Reno-portal Anastomosis

Left renal vein
Vena cava
Iliac vein graft
Portal vein
Iliac vein graft
Vena cava
Post-transplant CT

- Iliac vein graft
- Left renal vein
- Splenorenal shunt
Extensive PVT not amenable to primary PV reconstruction

- Reno-portal anastomosis
- TIPS +/- anticoagulation followed by LT
- Multi-visceral transplantation
TIPS for Patients with Cavernous Transformation
Utilize TIPS to treat PVT and prevent progression of clot in order to maintain candidacy for liver transplant.
Results - TIPS before LT

- In 9 patients with PVT, TIPS was successfully placed.
- 4 of 9 patients (44%) had cavernous transformation.
- 8 of 9 patients (89%) had improvement in PVT at follow-up.
- One patient failed therapy and re-thrombosed.
- 2 patients (22%) were successfully transplanted.

- TIPS is safe and effective in patients with PVT requiring LT. Patients can be successfully transplanted with optimal surgical anatomy.
Case presentation

- 10 yo girl, s/p LDLT for BA using left lateral segment at 15 months old
- Liver failure sec to chronic rejection, portal HTN and GI bleeding.
- PV cavernous transformation.
- TIPS was requested.
HV venogram + SMA angiogram
Simulation
TIPS canulation
TIPS placement
Re-Liver Transplantation

- TIPS (stent graft) could not be removed.
- Jump graft and reno-portal anastomosis were not option.
- Transected PV with TIPS in place.
- Reconstructed PV directly to the end of the TIPS
Case presentation

- 36 yo male, h/o Wilm’s tumor, s/p right nephrectomy + right hepatectomy, XRT resulting in biliary and duodenal stricture
- Long standing PTC
- 2ndary biliary cirrhosis
- PVT
- Recent gastrojejunostomy for duodenal stricture
- 2 Liver abscesses recently drained
- 175 cm, 51kg
The Transplant

- Isolate IMV and put vein graft in end-to-side
- Venoveno bypass to decompress portal pressure
- Mass clamp and transected hilum
- Right colon and diaphragm severely adheised to liver hilum -> removed
- Pericardium opened to access suprahepatic IVC
- Piggyback
- Choledocho-enterostomy for biliary reconstruction
By-pass Vein graft Jejunum IVC
The Transplant

- Isolate IMV and put vein graft in end-to-side
- Venovenovenous bypass to decompress portal pressure
- Mass clamp and transected hilum
- Right colon and diaphragm severely adhered to liver hilum -> removed
- Pericardium opened to access suprahepatic IVC
- Piggyback with addition lower cavo-cavostomy
- IMV to portal vein graft
- Right iliac artery to hepatic artery graft
- Choledocho-enterostomy for biliary reconstruction
The Transplant

- Isolate IMV and put vein graft in end-to-side
- Venoveno bypass to decompress portal pressure
- Mass clamp and transected hilum
- Right colon and diaphragm severely adheised to liver hilum
- Removed
- Pericardium opened to access suprahepatic IVC
- Piggyback with addition lower cavo-cavostomy
- IMV to portal vein graft
- Right iliac artery to hepatic artery graft
- Choledocho-enterostomy for biliary reconstruction
The Transplant

- Isolate IMV and put vein graft in end-to-side
- Venoveno bypass to decompress portal pressure
- Mass clamp and transected hilum
- Right colon and diaphragm severely adheised to liver hilum -> removed
- Pericardium opened to access suprahepatic IVC
- Piggyback with addition lower cavo-cavostomy
- IMV to portal vein graft
- Right iliac artery to hepatic artery graft
- Choledocho-enterostomy for biliary reconstruction
Sometimes it is impossible to anticipate the worst that can happen......

So to get through the “impossible” situation.........
Summary

Prepare, Practice and Stay Calm